



ENCODER
PRODUCTS COMPANY

Specialty Encoders

Spring 2007

Product Reference



ACCU>>CODER
by Encoder Products Company

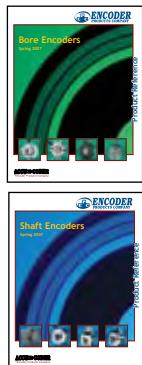
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Specialty Encoders

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Encoder Solutions For Every Application



Don't forget to check out the rest of our product families. Encoder Products Company manufactures a complete line of encoder solutions.

Bore Encoders - From small to large, a complete line of thru and hollow bore encoders with the most comprehensive selection of mounting options available in the industry.

Shaft Encoders - A comprehensive selection of solid shaft encoders, in the most popular industry standard sizes for every encoder need.

About Encoder Products

Company History

Encoder Products Company Inc. (EPC) is a leading designer and world-wide manufacturer of motion sensing devices. Founded in 1969 by William Watt, EPC began operations with a small line of custom encoders. Today, more than 35 years later, EPC's popular Accu-Coder™ brand is the most complete line of incremental and absolute shaft encoders in the industry. Our core philosophy is that each and every customer deserves quality products, superior customer service, and expert support.

Business Partnerships

Fostering long term business partnerships with satisfied customers is what we do best, and the heart of our mission. We take pride in providing superior customer service and supplying you an encoder that functions precisely, dependably, and flawlessly. Listening to our customers needs, and designing products that provide solutions for them, is a key to our success. It isn't every company that can say they have satisfied their customers for over 35 years!

Innovative Design Team

At EPC, we concentrate on encoders, making us famous for paving the path of the encoder industry and providing encoder standards for our industry since 1969. First to design the cube style encoder, now an industry standard. First to resolve mounting installation problems by providing an industry first flexible-mounting system. First to include Opto-ASIC technology, which virtually eliminates miscounts by eliminating electrical noise, and enhancing signal quality. First to provide an encoder that operates at 120° C. First to provide 6000 CPR in a 1.5" diameter encoder. First to provide a 3 year standard warranty, demonstrating that we stand proudly behind the reliability of each of our products.

Solving Problems

For over 35 years, we have been solving encoder problems. Custom designs, faster delivery, and reliable products are all areas in which we excel. We believe that an encoder supplier should solve problems, not cause them.

Custom Encoders Our Specialty

Through years of experience, we understand each industrial environment is different; you need an encoder that fits your specific situation. This ultimately means not having to make due with someone else's specifications or configurations, but having your own custom designed unit. Many of our customers have come to depend on us for this special area of customization. Using state of the art technology, we can design and deliver custom encoders faster than most suppliers standard products - often shipping your unique encoder in 2 to 6 days or sooner.

ISO 9001 Quality Systems

At EPC, quality is designed into every product. Before it's offered for sale, each Accu-Coder™ model is developed using state-of-the-art design tools and fully tested against EPC's exacting quality standards. But quality does not stop at design. During the manufacturing process, each Accu-Coder™ is subjected to a series of stringent quality control tests to ensure you are receiving the best encoder available. Our quality system has successfully been audited to the requirements of ISO 9001:2000, an internationally recognized standard for comprehensive Quality Systems. By paying close attention to detail, our Accu-Coder™ brand has become known throughout the industry for quality and reliability.

Model 802S



Features

- Industry Standard Size 20 (2" diameter) Stainless Steel Package
- Flange and Servo Mounting
- Up to 30,000 CPR
- 80 lb Maximum Axial and Radial Shaft Loading
- IP66 Sealing Available

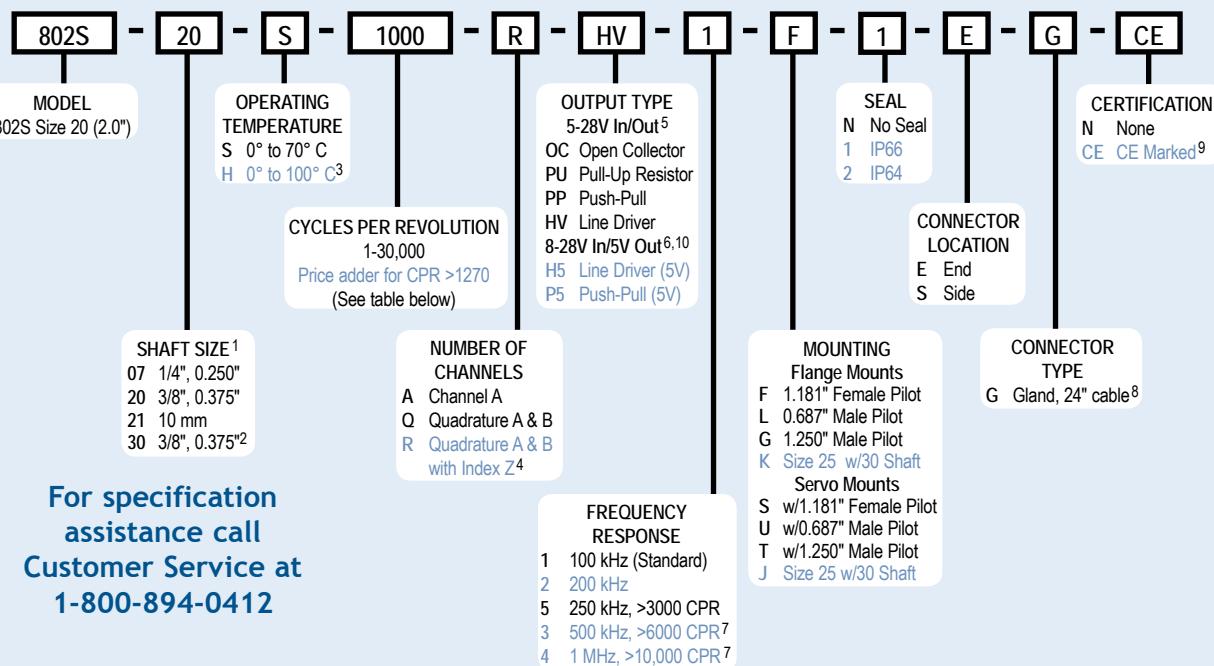
The Model 802S Accu-Coder™ is a heavy duty, industry standard Size 20 (2.0" diameter) encoder specifically designed for harsh factory and plant floor environments. The Model 802S is available with a variety of flange and servo mounting styles, making it easy to use in a broad range of applications. Its heavy duty, double shielded ball bearings are rated at 80 pounds maximum axial and radial shaft load, ensuring long operating life. This ultra-rugged, yet compact encoder is housed in a type 316 stainless steel enclosure, making it ideal for applications where contamination or exposure to caustic chemicals is a concern. But don't let its tough exterior fool you, the Model 802S provides the precise, reliable output you've come to expect from Accu-Coder™.

Common Applications

Food Processing, Oil, Gas & Chemical Processing, Material Handling, Conveyors, Robotics, Elevator Controls, Textile Machines

Model 802S Ordering Guide

Blue type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



For specification
assistance call
Customer Service at
1-800-894-0412

Model 802S CPR Options

0001*	0002*	0004*	0005*	0006*	0007*	0008*	0010*	0011*
0012*	0014*	0020	0021*	0024*	0025*	0028*	0030*	0032*
0033*	0034*	0035*	0038*	0040*	0042*	0045*	0050*	0060
0064*	0100	0120	0125	0128*	0144*	0150*	0160*	0200
0240*	0250	0254*	0256*	0300	0333*	0360	0400	0500
0512	0600	0625*	0635	0665*	0720	0768*	0800	0889
0900*	1000	1024	1200	1201 ^a	1203 ^a	1204 ^a	1250 ^a	1270 ^a
1440	1500	1800	2000	2048	2400 ^a	2500	2540 ^a	2880 ^a
3000 ^a	3600 ^a	4000 ^a	4096 ^a	5000 ^a	6000 ^a	7200 ^a	7500 ^a	9000 ^a
10,000 ^a	10,240 ^a	12,000 ^a	12,500 ^a	14,400 ^a	15,000 ^a	18,000 ^a	20,000 ^a	20,480 ^a
25,000 ^a								

* Contact Customer Service for High Temperature Option.

^a High Temperature Option (H) limited to 85° C maximum for these CPR options.

New CPR values are periodically added to those listed. Contact Customer Service to determine all currently available CPR values. Special disk resolutions are available upon request. A one-time NRE fee may apply.

NOTES:

- 1 Contact Customer Service for additional options.
- 2 Shaft with Size 25 Mounting Adapter, J or K mounting only.
- 3 0° to 85° C for certain resolutions, see CPR Options.
- 4 Contact Customer Service for non-standard index gating options.
- 5 24 VDC max for high temperature option.
- 6 Standard temperature, 60 to 3000 CPR only.
- 7 Standard cable lengths only. For additional information please refer to Technical Bulletin TB116: *Noise and Signal Considerations at Encoder site*.
- 8 For non-standard cable lengths, add a forward slash (/) plus cable length expressed in feet. Example: G/6 = 6 feet of cable.
- 9 For additional information please refer to Technical Bulletin TB100: *When to Choose the CE Option* at Encoder site.
- 10 CE not available with H5/P5 output type options.

Model 802S

Model 802S Specifications

Electrical

Input Voltage	4.75 to 28 VDC max for temperatures up to 70° C 4.75 to 24 VDC for temperatures between 70° C to 100° C
Input Current	100 mA max with no output load
Input Ripple	100 mV peak-to-peak at 0 to 100 kHz
Output Format	Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the encoder mounting face. See <i>Waveform Diagrams</i> below.
Output Types	Open Collector- 100 mA max per channel Pull-Up- 100 mA max per channel Push-Pull- 20 mA max per channel (Meets RS 422 at 5 VDC supply)
Index	Occurs once per revolution. The index for units >3000 CPR is 90° gated to Outputs A and B. See <i>Waveform Diagrams</i> below.
Freq Response	Up to 1 MHz.
Noise Immunity	Tested to BS EN61000-4-2; IEC801-3; BS EN61000-4-4; DDENV 50141; DDENV 50204; BS EN55022 (with European compliance option); BS EN61000-6-2; BS EN50081-2
Symmetry	1 to 6000 CPR: 180° ($\pm 18^\circ$) electrical at 100 kHz output 6001 to 20,480 CPR: 180° ($\pm 36^\circ$) electrical
Quad Phasing	1 to 6000 CPR: 90° ($\pm 22.5^\circ$) electrical at 100 kHz output 6001 to 20,480 CPR: 90° ($\pm 36^\circ$) electrical
Min Edge Sep.	1 to 6000 CPR: 67.5° electrical at 100 kHz output 6001 to 20,480 CPR: 54° electrical >20,480 CPR: 50° electrical
Rise Time	Less than 1 microsecond
Accuracy	Instrument and Quadrature Error: For 200 to 1999 CPR, 0.017° mechanical (1.0 arc minutes) from one cycle to any other cycle. For 2000 to 3000 CPR, 0.01° mechanical (0.6 arc minutes) from one cycle to any other cycle. Interpolation error (units > 3000 CPR only) within 0.005° mechanical. (Total Optical Encoder Error = Instrument + Quadrature + Interpolation)

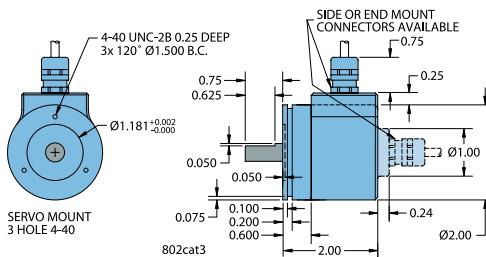
Mechanical

Max Shaft Speed	8000 RPM. Higher shaft speeds may be achievable, contact Customer Service.
Shaft Size	0.250", 0.375", or 10 mm
Radial Shaft Load	80 lb max. Rated load of 20 to 40 lb for bearing life of 1.5×10^9 revolutions
Axial Shaft Load	80 lb max. Rated load of 20 to 40 lb for bearing life of 1.5×10^9 revolutions
Starting Torque	1.0 oz-in typical with IP64 seal or no seal 3.0 oz-in typical with IP66 shaft seal
Moment of Inertia	5.2×10^{-4} oz-in-sec 2
Max Acceleration	1×10^5 rad/sec 2
Electrical Conn	Gland with 24" cable (foil and braid shield, 24 AWG conductors)
Housing	Type 316 Stainless Steel
Bearings	Precision ABEC ball bearings
Mounting	Various flange or servo mount styles.
Weight	1.5 lb typical

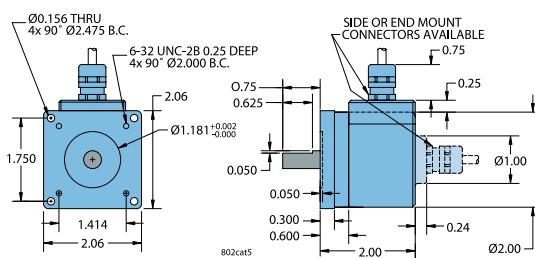
Environmental

Operating Temp	0° to 70° C for standard models 0° to 100° C for high temperature option (0° to 85° C for certain resolutions, see CPR Options.)
Storage Temp	-25° to +85° C
Humidity	98% RH non-condensing
Vibration	20 g @ 58 to 500 Hz
Shock	75 g @ 11 ms duration
Sealing	IP66 shaft seal (NEMA 13 and 4/4X); or IP64 bearing seal

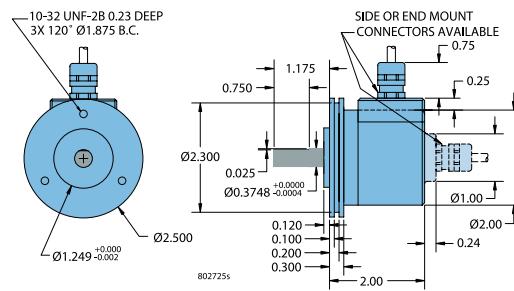
Model 802S Servo Mount (S)



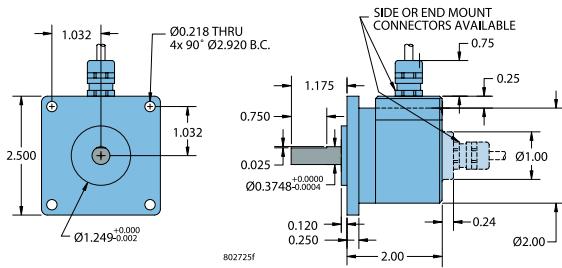
Model 802S Flange Mount (F)



Model 802S Size 25 (2.5") Servo Mount (J)



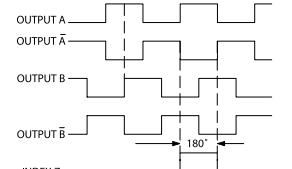
Model 802S Size 25 (2.5") Flange Mount (K)



All dimensions are in inches with a tolerance of ± 0.005 " or ± 0.01 " unless otherwise specified

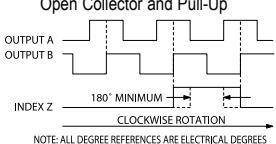
Waveform Diagrams

Line Driver and Push-Pull



NOTE: ALL DEGREE REFERENCES ARE ELECTRICAL DEGREES
LOGIC

Open Collector and Pull-Up



NOTE: ALL DEGREE REFERENCES ARE ELECTRICAL DEGREES
LOGIC

Wiring Table

Function	Gland Cable Wire Color
Com	Black
+VDC	Red
A	White
A'	Brown
B	Blue
B'	Violet
Z	Orange
Z'	Yellow
Shield	Bare*

* CE Option: Cable Shield (bare wire) is connected to internal case

Model 858S



Features

- Industry Standard Size 58 (58 mm Diameter) Stainless Steel Package
- Up to 30,000 CPR
- 80 lb Maximum Axial and Radial Shaft Loading
- 100° C Operating Temperature Available
- IP66 Sealing Available

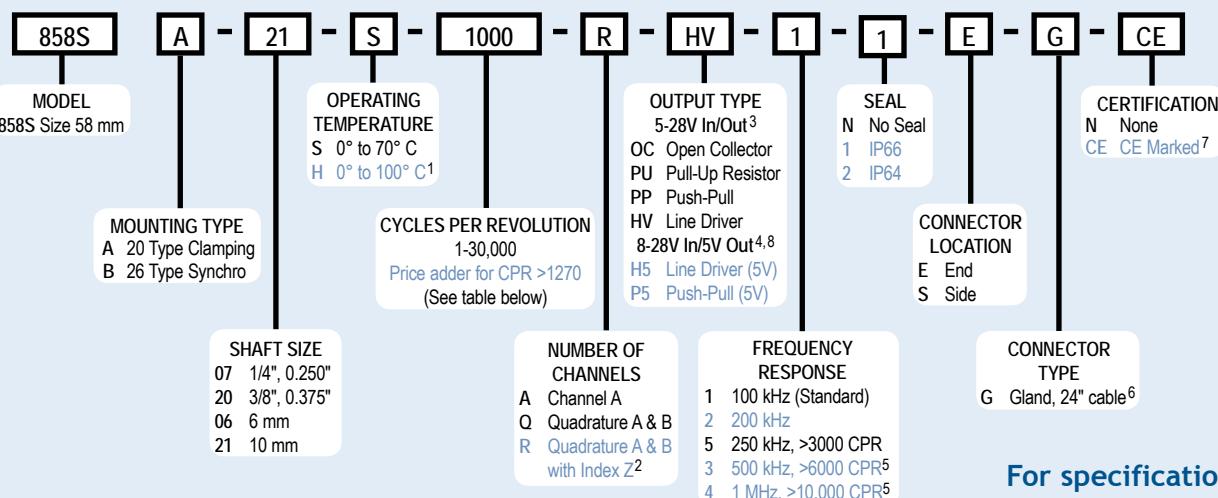
The Model 858S European Size 58 Accu-Coder™ is a heavy duty, extremely rugged, reliable encoder, in a 316 stainless steel package. Its compact design is well suited for harsh factory and plant floor environments, calling for a metric solution. The double-shielded ball bearings are rated at 80 pound maximum axial and radial shaft loading, to ensure a long operating life. Shock rating is 75 g for 11 milliseconds duration. With the optional heavy-duty shaft seal installed, the Model 858S is rated at IP66 (NEMA 4 & 13). Two European standard mounting options are available, the Clamping Flange (20 Type), or the Synchro Flange (26 Type).

Common Applications

Food Processing, Oil, Gas & Chemical Processing, Material Handling, Conveyors, Robotics, Elevator Controls, Textile Machines

Model 858S Ordering Guide

Blue type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



For specification
assistance call
Customer Service at
1-800-894-0412

Model 858S CPR Options

0001*	0002*	0004*	0005*	0006*	0007*	0008*	0010*	0011*
0012*	0014*	0020	0021*	0024*	0025*	0028*	0030*	0032*
0033*	0034*	0035*	0038*	0040*	0042*	0045*	0050*	0060
0064*	0100	0120	0125	0128*	0144*	0150*	0160*	0200
0240*	0250	0254*	0256*	0300	0333*	0360	0400	0500
0512	0600	0625*	0635	0665*	0720	0768*	0800	0889
0900*	1000	1024	1200	1201*a	1203*a	1204*a	1250*a	1270*a
1440	1500	1800	2000	2048	2400*a	2500	2540*a	2880*a
3000 ^a	3600 ^a	4000 ^a	4096 ^a	5000 ^a	6000 ^a	7200 ^a	7500 ^a	9000 ^a
10,000 ^a	10,240 ^a	12,000 ^a	12,500 ^a	14,400 ^a	15,000 ^a	18,000 ^a	20,000 ^a	20,480 ^a
25,000 ^a								30,000 ^a

* Contact Customer Service for High Temperature Option.

^a High Temperature Option (H) limited to 85° C maximum for these CPR options.

New CPR values are periodically added to those listed. Contact Customer Service to determine all currently available CPR values. Special disk resolutions are available upon request.
A one-time NRE fee may apply.

NOTES:

- 1 0° to 85° C for certain resolutions, see CPR Options.
- 2 Contact Customer Service for non-standard index gating options.
- 3 24 VDC max for high temperature option.
- 4 Standard temperature, 60 to 3000 CPR only.
- 5 Standard cable lengths only. For additional information please refer to Technical Bulletin TB116: *Noise and Signal Considerations at Encoder site*.
- 6 For non-standard cable lengths, add a forward slash (/) plus cable length expressed in feet. Example: G/6 = 6 feet of cable.
- 7 For additional information please refer to Technical Bulletin TB100: *When to Choose the CE Option* at Encoder site.
- 8 CE not available with H5/P5 output type options.

Model 858S

Model 858S Specifications

Electrical

Input Voltage.....4.75 to 28 VDC max for temperatures up to 70° C
 4.75 to 24 VDC for temperatures between 70° C to 100° C
 100 mA max with no output load
 Input Ripple.....100 mV peak-to-peak at 0 to 100 kHz
 Output Format.....Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the encoder mounting face. See *Waveform Diagrams* below.
 Output Types.....Open Collector- 100 mA max per channel
 Pull-Up- 100 mA max per channel
 Push-Pull- 20 mA max per channel
 Line Driver- 20 mA max per channel (Meets RS 422 at 5 VDC supply)
 Index.....Occurs once per revolution. The index for units >3000 CPR is 90° gated to Outputs A and B. See *Waveform Diagrams* below.
 Freq Response.....Up to 1 MHz.
 Noise Immunity.....Tested to BS EN61000-4-2; IEC801-3; BS EN61000-4-4; DDENV 50141; DDENV 50204; BS EN55022 (with European compliance option); BS EN61000-6-2; BS EN50081-2
 Symmetry.....1 to 6000 CPR: 180° (±18°) electrical at 100 kHz output
 6001 to 20,480 CPR: 180° (±36°) electrical
 Quad Phasing.....1 to 6000 CPR: 90° (±22.5°) electrical at 100 kHz output
 6001 to 20,480 CPR: 90° (±36°) electrical
 Min Edge Sep.....1 to 6000 CPR: 67.5° electrical at 100 kHz output
 6001 to 20,480 CPR: 54° electrical
 >20,480 CPR: 50° electrical
 Rise Time.....Less than 1 microsecond
 Accuracy.....Instrument and Quadrature Error : For 200 to 1999 CPR, 0.017° mechanical (1.0 arc minutes) from one cycle to any other cycle.
 For 2000 to 3000 CPR, 0.01° mechanical (0.6 arc minutes) from one cycle to any other cycle.
 Interpolation error (units > 3000 CPR only) within 0.005° mechanical. (Total Optical Encoder Error = Instrument + Quadrature + Interpolation)

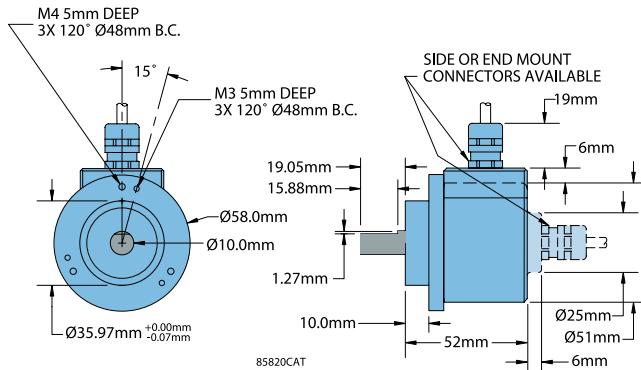
Mechanical

Max Shaft Speed.....8000 RPM. Higher shaft speeds may be achievable, contact Customer Service.
 Shaft Size.....0.250", 0.375", 6 mm, 10 mm
 Radial Shaft Load.....80 lb max. Rated load of 20 to 40 lb for bearing life of 1.5×10^9 revolutions
 Axial Shaft Load.....80 lb max. Rated load of 20 to 40 lb for bearing life of 1.5×10^9 revolutions
 Starting Torque.....1.0 oz-in typical with IP64 seal or no seal
 3.0 oz-in typical with IP66 shaft seal
 Moment of Inertia..... 5.2×10^{-4} oz-in-sec²
 Max Acceleration..... 1×10^5 rad/sec²
 Electrical Conn.....Gland with 24 inches of cable (foil and braid shield, 24 AWG conductors)
 Housing.....Type 316 Stainless steel
 Bearings.....Precision ABEC ball bearings
 Mounting.....European Standard Clamping Flange (20 Type) and Synchro Flange (26 Type)
 Weight.....1.5 lb typical

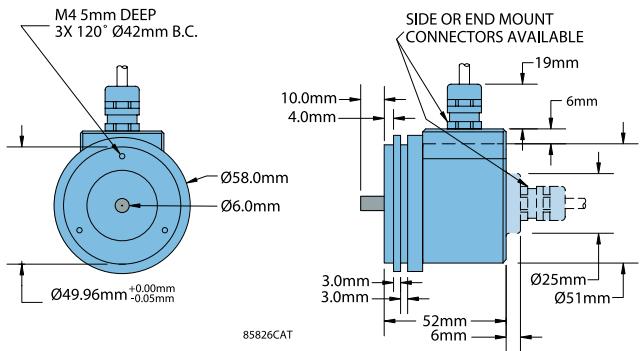
Environmental

Operating Temp.....0° to 70° C for standard models
 0° to 100° C for high temperature option (0° to 85° C for certain resolutions, see CPR Options.)
 Storage Temp.....-25° to +85° C
 Humidity.....98% RH non-condensing
 Vibration.....20 g @ 58 to 500 Hz
 Shock.....75 g @ 11 ms duration
 Sealing.....IP66 shaft seal (NEMA 13 and 4/4X); or IP64 bearing seal

Model 858 Clamping Flange 20 Type (A)

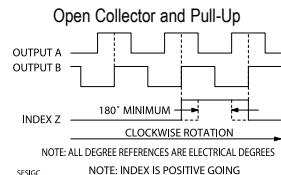
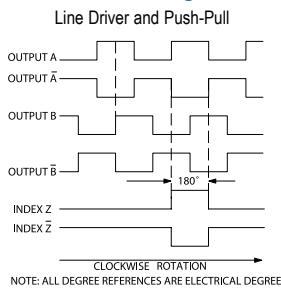


Model 858 Synchro Flange 26 Type (B)



All dimensions are in millimeters with a tolerance of ± 0.17 mm unless otherwise specified

Waveform Diagrams



Wiring Table

Function	Gland Cable Wire Color	Pin 12	8 Pin M12	10 Pin MS	7 Pin MS	7 Pin MS
Com	Black	3	7	F	F	F
+VDC	Red	I	2	D	D	D
A	White	†	1	A	A	A
A'	Brown	--	3	H	C	---
B	Blue	2	4	B	B	B
B'	Violet	--	5	I	E	---
Z	Orange	5	6	C	---	C
Z'	Yellow	---	---	---	---	---
Shield	Bare*	---	---	---	---	---

* CE Option: Cable Shield (bare wire) is connected to internal case

*CE Option: Cable shield (bare wire) is connected to internal case

Model 865T



Ø6.5"

Features

- A C-Face Thru-Bore Encoder With Stainless Steel Housing
- Fits NEMA Size 56C Thru 184 C Motor Faces (4.5" AK)
- Slim Profile - Only 1.0" Deep
- Incorporates Opto-ASIC Technology
- Resolutions to 4096 CPR

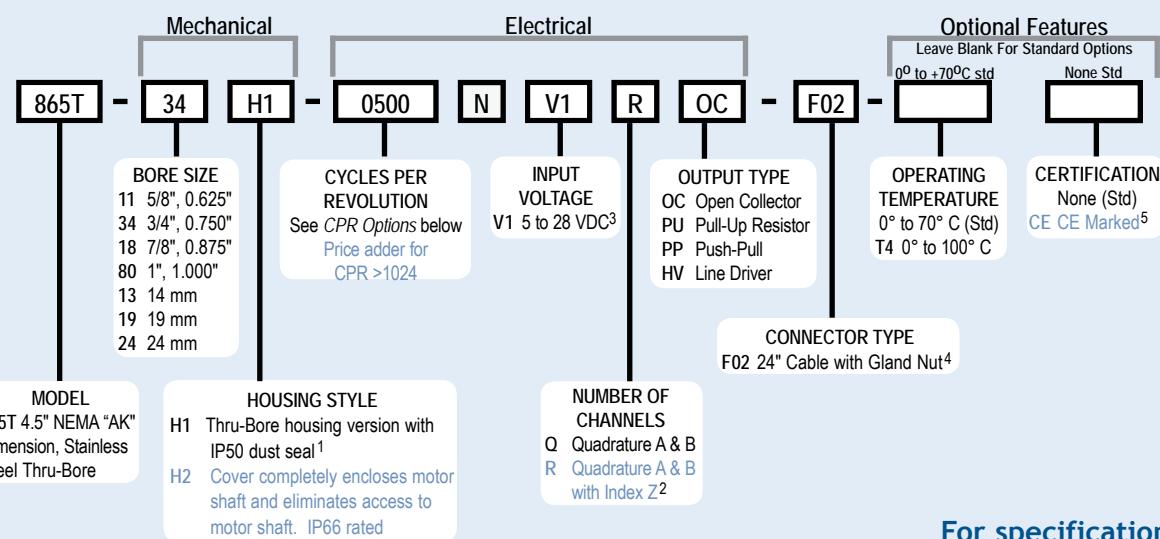
The Model 865T C-face encoder is a rugged, high resolution encoder designed to mount directly on NEMA C-face motors. Both sides of the encoder are C-face mounts, allowing additional C-face devices to be mounted to this encoder. Unlike many C-face kit type encoders, the Model 865T contains precision bearings and an internal flex mount, virtually eliminating encoder failures and inaccuracies induced by motor shaft runout or axial endplay. The advanced Opto-ASIC design provides advanced noise immunity necessary for many industrial applications. This encoder is ideal for applications using induction motors and flux vector control. The Model 865T provides speed and position information for drive feedback in a slim profile - only 1.0" thick. The Thru-Bore design allows fast and simple mounting of the encoder directly to the accessory shaft or to the drive shaft of the motor, using the standard motor face (NEMA sizes 56C - 184C). The tough, 316 stainless steel housing resists the corrosion and hazards of a caustic industrial environment.

Common Applications

Motor Feedback, Velocity & Position Control, Conveyors, Variable Speed Drives, Mixing & Blending Motors, Assembly & Specialty Machines

Model 865T Ordering Guide

Blue type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



For specification assistance call
Customer Service at
1-800-894-0412

Model 865T CPR Options

0060	0100	0120	0240	0250	0256
0500	0512	0600	1000	1024	2048
2500	4096				

Contact Customer Service for other disk resolutions;
not all disk resolutions available with all output types

NOTES:

- 1 Housing style H1 Thru-Bore version equipped with IP50 dust seal; unit must be mounted between two C-face devices with supplied gasket kit to be IP66 sealed.
- 2 Contact Customer Service for index gating options.
- 3 5 to 24 VDC max for high temperature option.
- 4 For non-standard cable lengths enter 'F' plus cable length expressed in feet. Example: F06 = 6 feet of cable.
- 5 Please refer to Technical Bulletin TB100: *When to Choose the CE Option at Encoder site*.

Model 865T

Model 865T Specifications

Electrical

Input Voltage.....4.75 to 28 VDC max for temperatures up to 70° C
 4.75 to 24 VDC for temperatures between 70° C to 100° C
 Input Current.....100 mA max with no output load
 Input Ripple.....100 mV peak-to-peak at 0 to 100 kHz
 Output Format.....Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the mounting face. See *Waveform Diagrams* below.
 Output Types.....Open Collector- 100 mA max per channel
 Pull-Up- 100 mA max per channel
 Push-Pull- 20 mA max per channel
 Line Driver- 20 mA max per channel (Meets RS 422 at 5 VDC supply)
 Index.....Once per revolution.
 0475 to 4096 CPR: Gated to output A
 0001 to 0474 CPR: Ungated
 See *Waveform Diagrams* below.

Freq. Response.....200 kHz
 Noise Immunity.....Tested to BS EN61000-4-2; IEC801-3; BS EN61000-4-4; DDENV 50141; DDENV 50204; BS EN55022 (with European compliance option); BS EN61000-6-2; BS EN50081-2
 Symmetry.....180°(±18°) electrical
 Quad. Phasing.....90°(±22.5°) electrical
 Min. Edge Sep.....67.5° electrical
 Rise Time.....Less than 1 microsecond

Mechanical

Max Shaft Speed.....6000 RPM. Higher shaft speeds may be achievable, contact Customer Service.
 Bore Size.....0.625", 0.750", 0.875", 1.000", 14 mm, 19 mm, and 24 mm
 Bore Tolerance.....+0.0015"/-0.000"

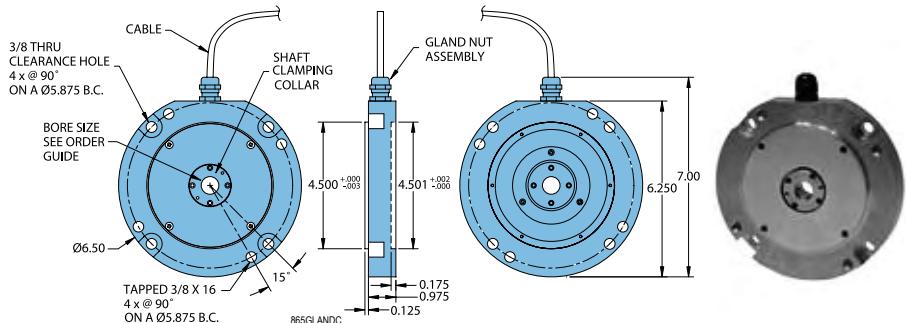
User Shaft Tolerances

Radial Runout.....0.005"
 Axial Endplay.....±0.015"
 Moment of Inertia..... 3.3×10^{-3} oz-in-sec² typical
 Electrical Conn.....Gland nut with 24" cable (foil and braid shield, 24 AWG conductors)
 Housing.....Type 316 Stainless Steel
 Mounting.....NEMA 56C to 184C
 Weight.....6 lb typical

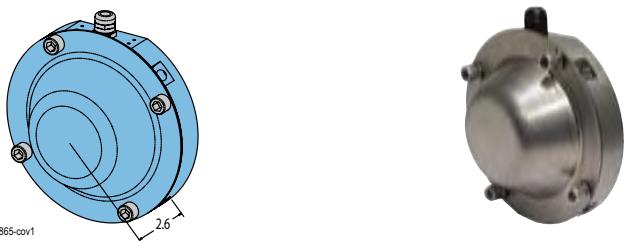
Environmental

Operating Temp.....0° to 70° C for standard models
 0° to 100° C for high temperature option
 Storage Temp.....-25° to 100° C
 Humidity.....98% RH non-condensing
 Vibration.....10 g @ 58 to 500 Hz
 Shock.....50 g @ 11 ms duration
 Sealing.....IP66 when mounted between two C-face devices with supplied gasket kit, or with H1 cover. IP50 if not installed in either manner.

Model 865T With Gland Nut (P)

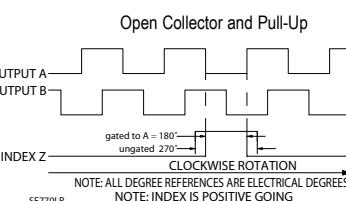
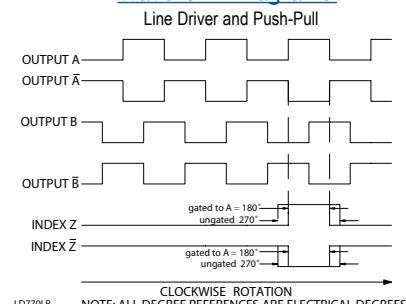


Model 865T Optional Housing Cover (H2)



All dimensions are in inches with a tolerance of +0.005" or +0.01" unless otherwise specified

Waveform Diagrams



Wiring Table

Function	Gland Cable Wire Color
Com	Black
+VDC	Red
A	White
A'	Brown
B	Blue
B'	Violet
Z	Orange
Z'	Yellow
Shield	Bare*

*CE Option:
 Cable Shield
 (bare wire) is
 connected to
 internal Case

Model 925



Features

- Standard Size 25 Package (2.5")
- Resolutions Up To 12 Bit (4096 Counts)
- Incorporates Opto-ASIC Technology
- Industrial Grade, Heavy Duty Housing
- Wide Range of Operating Voltages (4.75 to 26 VDC)

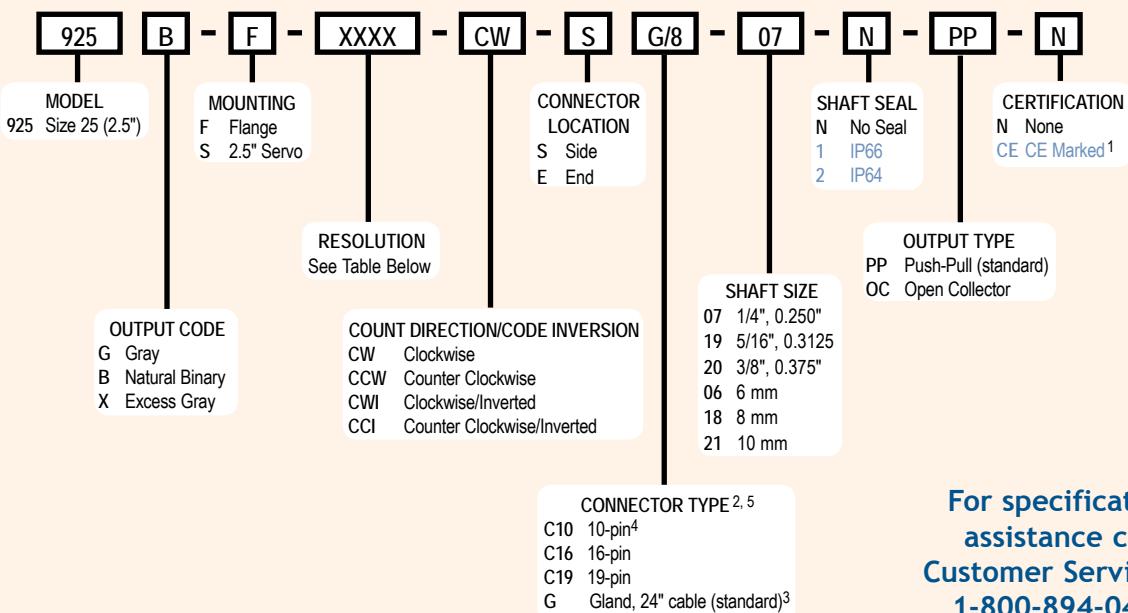
The Model 925 Single Turn Absolute Accu-Coder™ is ideal for a wide variety of industrial applications that require an encoder with the capability of absolute positioning output. Its fully digital output and innovative use of Opto-ASIC technology make the Model 925 an excellent choice for all applications, especially ones with a high presence of noise. Available with either round servo or square flange mounting, and a variety of connector and cabling options, the Model 925 is easily designed into a variety of application requirements. The Model 925, with its wide selection of shaft sizes supported by industrial grade, heavy duty bearings, and its optional IP66 seal, is ideal for rough environments.

Common Applications

Machine Tools, Robotics, Telescopes, Antennas, Rotary & X-Y Positioning Tables, Medical Scanners

Model 925 Ordering Guide

Blue type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model 925 Resolution Table

Output Code	Counts Per Resolution				
Gray Code	0256	0512	1024	2048	4096
Natural Binary	0250	0256	0360	0500	0512
	1024	1440	2000	2048	2880
					4000
Excess Gray	0180	0250	0360	0500	0720
	2000	2880	4000		1440

*Contact Customer Service for availability.

NOTES:

- 1 Please refer to Technical Bulletin TB100: *When to Choose the CE Option at Encoder site.*
Contact Customer Service for availability.
- 2 For additional connector styles please contact Customer Service.
- 3 Standard cable length is 24". For non-standard cable lengths, add a forward slash (/) plus cable length expressed in feet. Example: G/6 = 6 feet of cable.
- 4 Only available with 8 bit resolution encoder.
- 5 For mating connectors, cables, and cordsets, please see *Encoder site*.

Model 925

Model 925 Specifications

Electrical

Input Voltage 4.75 to 26 VDC max
 Regulation 100 mV peak-to-peak, max ripple at 0 to 10 kHz
 Input Current 100 mA max with no external load
 Output Format Absolute- Parallel Outputs
 Output Type Open Collector- 20 mA max per channel
 Push-Pull- 20 mA max per channel
 Code Gray Code, Natural Binary Code, Excess Gray Code
 Max Frequency 50 kHz (LSB)
 Rise Time Less than 1 microsecond
 Resolution Up to 12 bit
 Accuracy $\pm 1/2$ LSB

Control

Directional Control....Field selectable for increasing counts (CW or CCW)

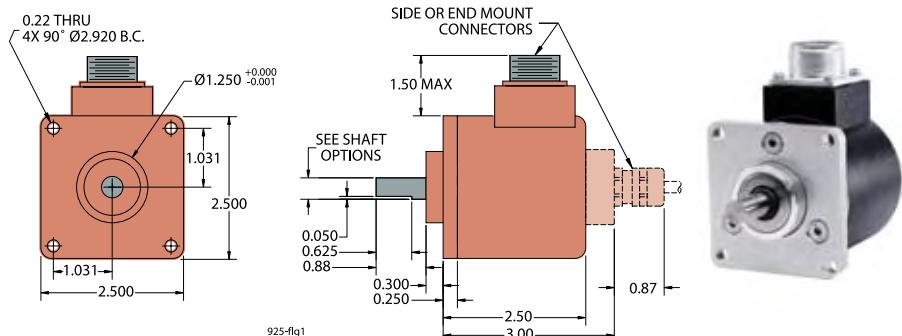
Mechanical

Max Shaft Speed.....6000 RPM continuous
 Shaft Size 0.250", 0.3125", 0.375", 6 mm, 8 mm
 Radial Shaft Load....35 lb max
 Axial Shaft Load 40 lb max
 Starting Torque 1.0 oz-in typical for no seal
 2.0 oz-in with IP64 shaft seal
 Max Acceleration..... 1×10^5 rad/sec²
 Electrical Conn Gland with 24" cable (braid shield, 30 AWG conductors), 10-, 16-, and 19-pin
 Housing.....Aluminum
 Mounting.....Flange or servo type
 Weight.....22 oz typical

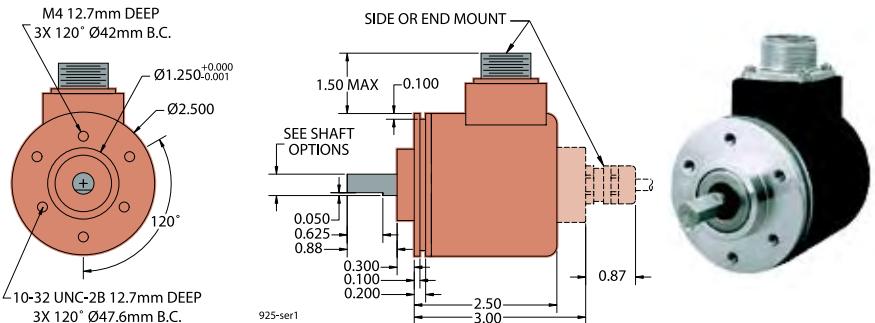
Environmental

Operating Temp.....0° to 70° C
 Storage Temp -20° to +85° C
 Humidity.....98% RH non-condensing
 Vibration.....10 g @ 58 to 500 Hz
 Shock.....20 g @ 11 ms duration
 Sealing.....IP54 (standard)
 IP64, or IP66 (NEMA 13 and 4) optional

Model 925 Flange Mount (F)



Model 925 2.5" Servo Mount (S)



All dimensions are in inches with a tolerance of ± 0.005 " or ± 0.01 " unless otherwise specified

Wiring Table

Function	19-PIN KPT02E14-19P		16-PIN	10-PIN* MS	Gland Cable or Mating Conn.
	Pin	Pin	Pin	Wire Color	
S1 MSB	A	3	A	Brown	NOTES: * Only available with 8-bit resolution encoders ** Where Fitted *** Direction Control- Standard is CW increasing when viewed from the shaft end. Direction pin is pulled high normally to 5V internally. Direction pin must be pulled low (GND, Common) to reverse count direction. Applied voltage to direction pin should not exceed 5V.
S2	B	5	B	White	
S3	C	6	C	Green	
S4	D	7	D	Orange	
S5	E	8	E	Blue	
S6	F	9	F	Violet	
S7	G	10	G	Gray	
S8 LSB 8-bit	H	11	H	Pink	
S9 LSB 9-bit	J	12	—	Red/Green	
S10 LSB 10-bit	K	13	—	Red/Yellow	
S11 LSB 11-bit	L	14	—	Turquoise	
S12 LSB 12-bit	M	15	—	Yellow	
Direction***	R	4	—	Red/Blue	
Case Ground	S	16	—	Drain/Screen	
0V Common	T	1	J	Black	
Special**	U	—	—	White/Red	
+VDC	V	2	I	Red	

Model 958



Features

- European Size 58 (58 mm) Package
- Resolutions Up To 12 Bit (4096 PPR equivalent)
- Incorporates Opto-ASIC Technology
- Industrial Grade, Heavy Duty Housing
- Wide Range of Operating Voltages (4.75 to 26 VDC)

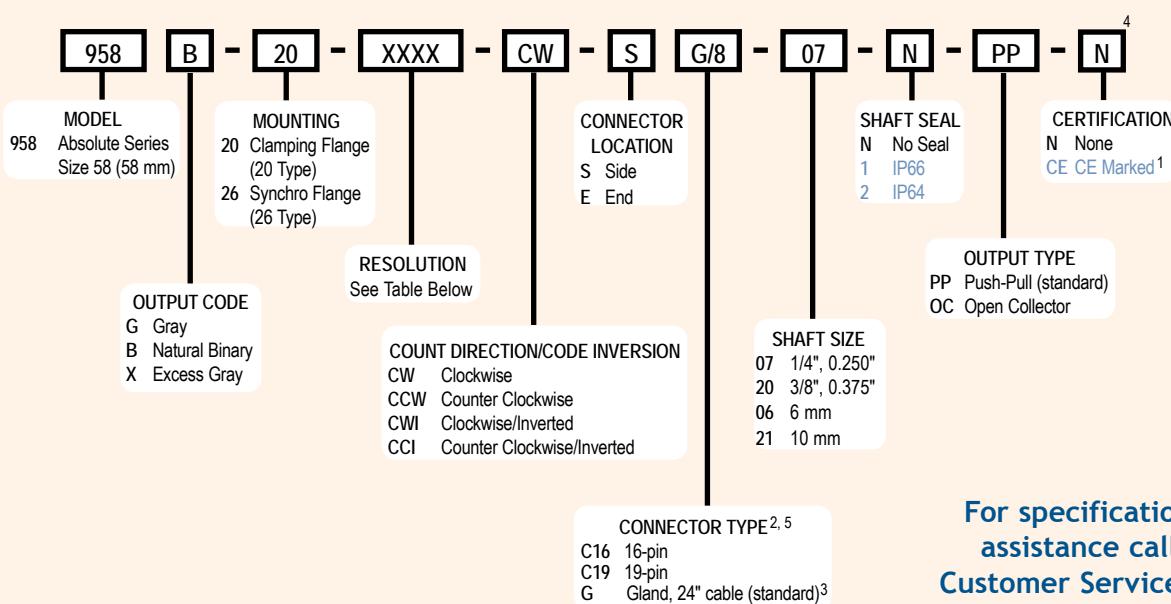
The Model 958 Single Turn Absolute Accu-Coder™ is ideal for a wide variety of industrial applications requiring an encoder with European Size 58 (58 mm) mounting and absolute positioning output. A rugged, industrial grade housing allows the Model 958 to be used in a wide variety of applications calling for a reliable, heavy-duty encoder. In addition, its innovative Opto-ASIC circuitry, coupled with its digital output, make it an excellent choice in those applications plagued by unusually high levels of electrical noise. Available with a choice of either type 20 or type 26 servo mounting, and a variety of connector and cabling options, the Model 958 is easily designed into a variety of applications. The Model 958 can also be ordered with stainless steel housing, heavy duty bearings, and an IP66 seal. (Contact a friendly EPC sales representative for more information). With so many options that make the Model 958 ultra-durable, this absolute encoder can tolerate the worst environments!

Common Applications

Machine Tools, Robotics, Telescopes, Antennas, Rotary & X-Y Positioning Tables, Medical Scanners

Model 958 Ordering Guide

Blue type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model 958 Resolution Table

Output Code	Counts Per Resolution				
Gray Code	0256	0512	1024	2048	4096
Natural Binary	0250	0256	0360	0500	0512
	1024	1440	2000	2048	2880
Excess Gray	0180	0250	0360	0500	0720
	2000	2880	4000	1000	1440

*Contact Customer Service for availability.

NOTES:

- 1 Please refer to Technical Bulletin TB100: *When to Choose the CE Option* at Encoder site. Contact Customer Service for availability.
- 2 For additional connector styles please contact Customer Service.
- 3 Standard cable length is 24". For non-standard cable lengths, add a forward slash (/) plus cable length expressed in feet. Example: G/6 = 6 feet of cable.
- 4 Also available in stainless steel housing. Contact Customer Service for details.
- 5 For mating connectors, cables, and cordsets, please see Encoder site.

Model 958

Model 958 Specifications

Electrical

Input Voltage.....4.75 to 26 VDC max
 Regulation.....100 mV peak-to-peak, max ripple at 0 to 100 kHz
 Input Current.....100 mA max with no external load
 Output Format.....Absolute- Parallel Outputs
 Output Type.....Open Collector- 20 mA max per channel
 Push-Pull- 20 mA max per channel
 Code.....Gray Code, Natural Binary Code, Excess Gray Code
 Max Frequency.....50 kHz (LSB)
 Rise Time.....Less than 1 microsecond
 Resolution.....Up to 12 bit
 Accuracy.....+1/2 LSB

Control

Directional Control....Field selectable for increasing counts (CW or CCW)

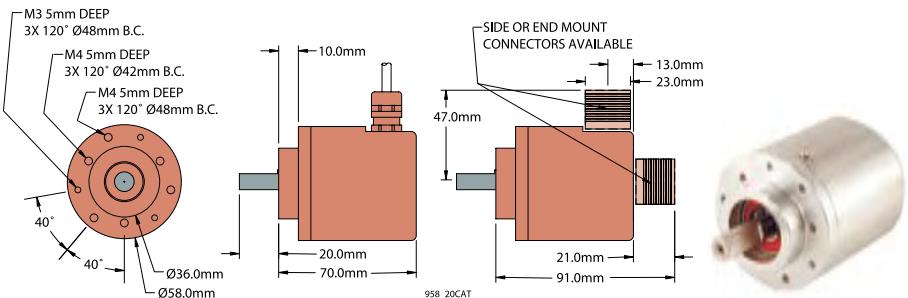
Mechanical

Max Shaft Speed.....6000 RPM continuous
 Shaft Size.....0.250", 0.375", 6 mm, 10 mm
 Radial Shaft Load.....27 lb max
 Axial Shaft Load.....27 lb max
 Starting Torque.....1.0 oz-in typical for no seal
 2.0 oz-in with IP64 shaft seal
 Max Acceleration..... 1×10^5 rad/sec²
 Electrical Conn.....Gland with 24" cable (braid shield, 30 AWG conductors), 16-, 19-pin
 Housing.....Aluminum
 Mounting.....European Standard Clamping Flange (20 Type) and Synchro Flange (26 Type)
 Weight.....22 oz typical

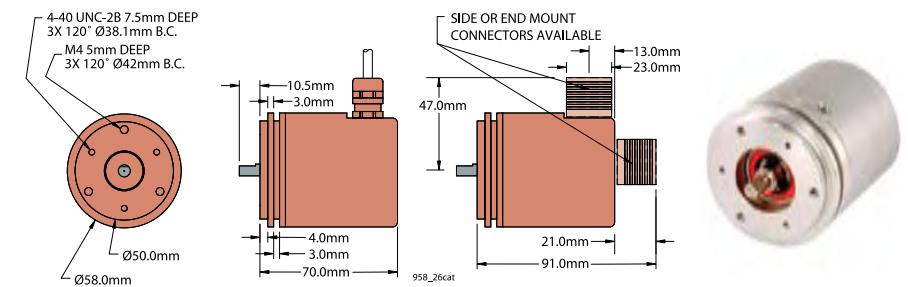
Environmental

Operating Temp.....0° to 70° C
 Storage Temp.....-20° to +85° C
 Humidity.....98% RH non-condensing
 Vibration.....10 g @ 58 to 500 Hz
 Shock.....20 g @ 11 ms duration
 Sealing.....IP54 (standard)
 IP64, or IP66 (NEMA 13 and 4) optional

Model 958 Clamping Flange 20 Type (20)



Model 958 Synchro Flange 26 Type (26)



All dimensions are in millimeters with a tolerance of ± 0.17 mm unless otherwise specified

Wiring Table

Function	19-PIN KPT02E14-19P		Gland Cable or Mating Conn.
	Pin	Pin	
S1 MSB	A	3	Brown
S2	B	5	White
S3	C	6	Green
S4	D	7	Orange
S5	E	8	Blue
S6	F	9	Violet
S7	G	10	Gray
S8 LSB 8-bit	H	11	Pink
S9 LSB 9-bit	J	12	Red/Green
S10 LSB 10-bit	K	13	Red/Yellow
S11 LSB 11-bit	L	14	Turquoise
S12 LSB 12-bit	M	15	Yellow
Direction***	R	4	Red/Blue
Case Ground	S	16	Drain/Screen
0V Common	T	1	Black
Special**	U	—	White/Red
+VDC	V	2	Red

NOTES:

- * Only available with 8-bit resolution encoders
- ** Where Fitted
- *** Direction Control- Standard is CW increasing when viewed from the shaft end. Direction pin is pulled high normally to 5V internally. Direction pin must be pulled low (GND, Common) to reverse count direction. Applied voltage to direction pin should not exceed 5V.

Model 960



Features

- Low Profile - 1.55"
- Thru-Bore or Hollow Bore Styles
- Industrial Grade, Heavy Duty Housing
- State-of-the-Art Opto-ASIC Circuitry

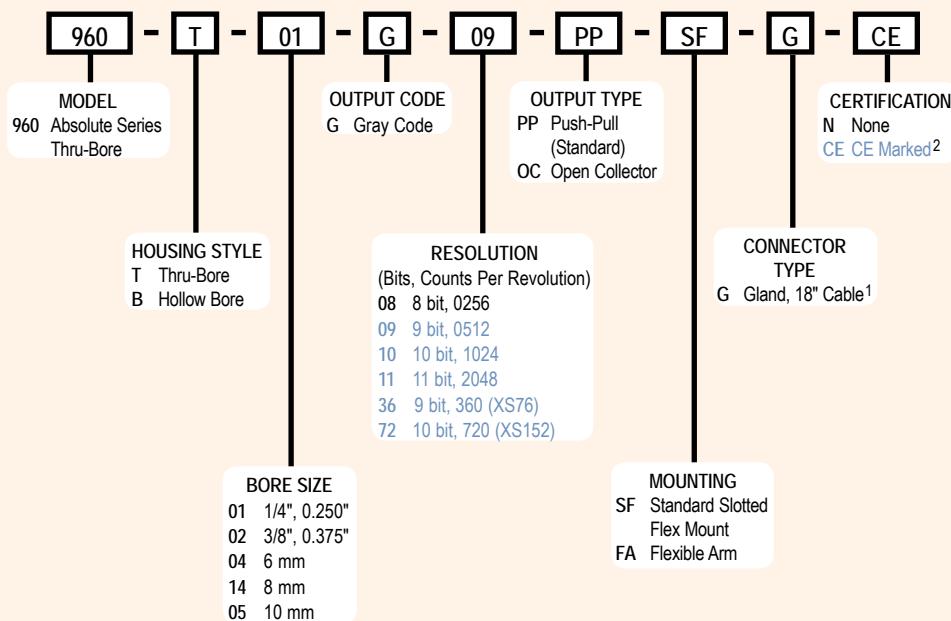
The single-turn Model 960 Absolute Series Accu-Coder™ provides an unique solution to a wide variety of industrial applications requiring absolute position information. By providing a low profile package of just 1.55", a variety of hollow and thru-bore sizes, and an easy to use flexible mounting system, the Model 960 goes where traditional absolute encoders do not fit. In addition, its innovative Opto-ASIC circuitry, coupled with its digital output, make it an excellent choice in those applications plagued by an unusually high level of electrical noise. The Model 960 can easily be mounted directly on a motor shaft, bringing the advantage of absolute positioning in an all metal housing while eliminating the fixtures, couplers, and adapters required by other absolute encoder designs.

Common Applications

Machine Tools, Robotics, Telescopes, Antennas, Rotary & X-Y Positioning Tables, Medical Scanners

Model 960 Ordering Guide

Blue type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



For specification
assistance call
Customer Service at
1-800-894-0412

NOTES:

- 1 For non-standard cable lengths, add a forward slash (/) plus cable length expressed in feet. Example: G/6 = 6 feet of cable.
- 2 Please refer to Technical Bulletin TB100: *When to Choose the CE Option* at Encoder site.

Model 960

Model 960 Specifications

Electrical

Input Voltage..... 4.75 to 26 VDC max
 Regulation..... 100 mV peak-to-peak, max ripple at 0 to 100 kHz
 Input Current..... 100 mA max with no output load
 Output Format..... Absolute- Parallel Outputs
 Output Type..... Open Collector- 20 mA max per channel
 Push-Pull- 20 mA max per channel
 Code..... Gray Code, Excess Gray Code
 Max Frequency..... 25.6 kHz (LSB)
 Rise Time..... Less than 1 microsecond
 Resolution..... up to 11 bit
 Accuracy..... $\pm 1/2$ LSB

Control

Directional Control.... Field selectable for increasing counts (CW or CCW). Standard configuration user selects the applicable MSB wire for direction of count. Direction control option allows user to select count direction by applying 0 VDC to an encoder input. See *Absolute Series Wiring Tables* below.

Mechanical

Max. Shaft Speed.... 6000 RPM continuous
 Bore Size..... 0.250", 0.375", 6 mm, 8 mm, 10 mm
 Bore Tolerance..... -0.0000" / +0.0006"

User Shaft Tolerances

Radial Runout..... 0.007"
 Axial Endplay..... $\pm 0.030"$

Starting Torque..... 0.3 oz-in typical for thru-bore
 0.14 oz-in typical for hollow bore

Max Acceleration..... 1×10^5 rad/sec²

Electrical Conn..... Gland with 18" cable (braid shield, 30 AWG conductors)

Housing..... Aluminum with non-corrosive finish

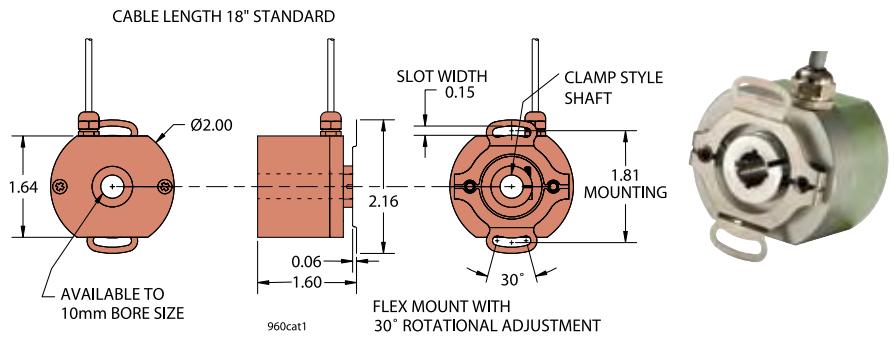
Mounting..... Slotted Flex Mount standard, Flex-Mount Arm optional

Weight..... 7 oz typical

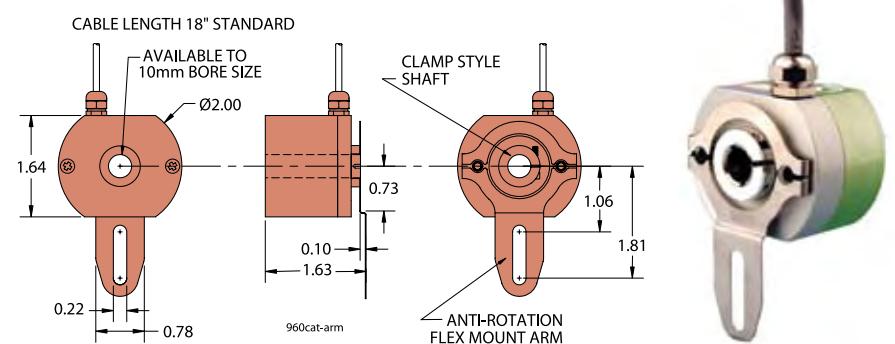
Environmental

Operating Temp..... 0° to 70° C
 Storage Temp..... -20° to +85° C
 Humidity..... 98% RH non-condensing
 Vibration..... 10 g @ 58 to 500 Hz
 Shock..... 20 g @ 11 ms duration

Model 960 Slotted Flex Mount (SF)



Model 960 With Flex Arm (FA)



All dimensions are in inches with a tolerance of $\pm 0.005"$ or $\pm 0.01"$ unless otherwise specified

Wiring Table

Function	Gland Cable	NOTES:
Common	Black	* CE Option Only
+VDC	Red	**Standard is CW increasing count (when viewed from shaft end, and using brown wire for MSB). Direction Control is pulled up internally to 5 VDC. To reverse count direction, Direction Control must be pulled low (0 VDC). If 5 VDC is applied to Direction Control, unit remains in standard CW increasing count mode. Count direction can also be reversed by using the Yellow MSB wire instead of the Brown. At no time should voltage applied to Direction Control exceed 5 VDC.
S1 cw MSB	Brown	
S1 ccw MSB	Yellow	
S2	White	
S3	Green	
S4	Orange	
S5	Blue	
S6	Violet	
S7	Gray	
S8 LSB 8-bit	Pink	
S9 LSB 9-bit	Red/Green	
S10 LSB 10-bit	Red/Yellow	
S11 LSB 11-bit	Turquoise	
Direction Control**	Red/Blue	
Case Ground*	Shield	

Model LCE - Linear Cable Encoder



Features

- Low Cost Linear Solution
- Resolutions from 2 to 500 Cycles Per Inch
- IP65 Sealing Available
- 0 Inch to 50 Inch Cable Measurement

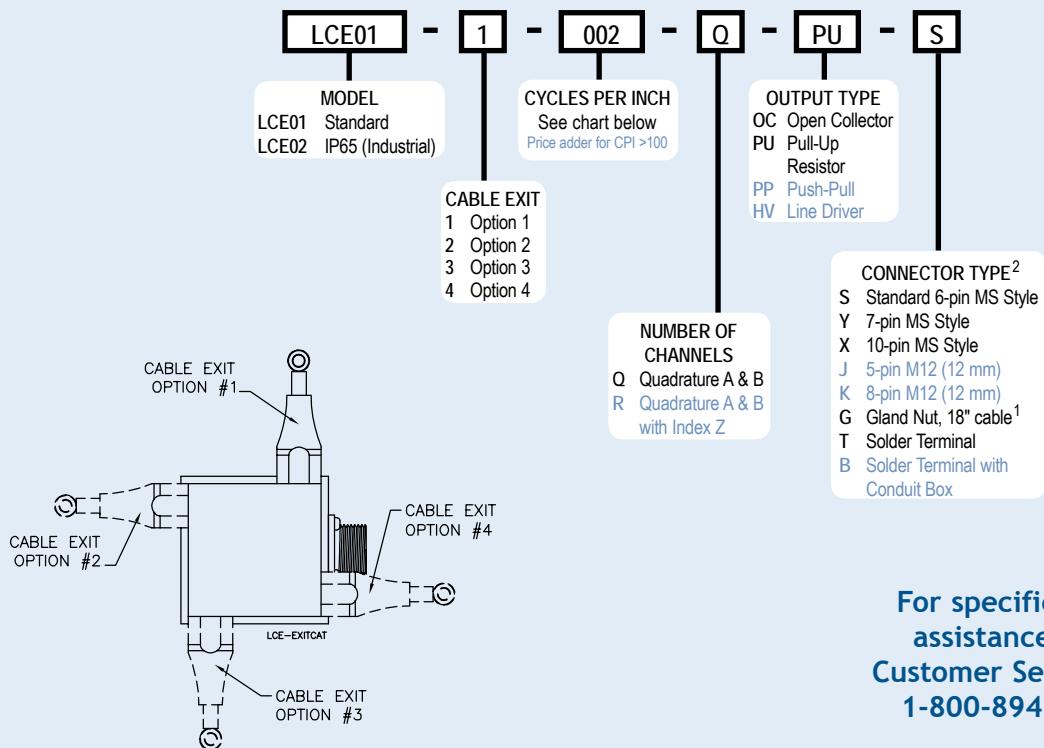
The Linear Cable Encoder (LCE) provides a low cost alternative for obtaining accurate linear measurements. As opposed to typical rotary shaft style encoders, the LCE has a retractable stainless steel cable, allowing for numerous and unusual measuring configurations. Placing the LCE away from harsh environmental conditions, while still providing precise measurements, gives the LCE an outstanding advantage over shaft style encoders. Installation is easy with a variety of cable exit directions, and perfect parallel alignment no longer necessary. The heart of the LCE is the popular E-Cube Accu-Coder™, the finest cube style encoder available. The E-Cube advantage provides a reliable digital pulse train in either single channel or quadrature format, with resolutions down to 0.002" per cycle. The small overall size, a variety of resolutions, and many different connector types, makes the versatility of the LCE unbeatable!

Common Applications

Robotics, Extrusion Presses, Valve Positioning, Textile Machinery, Control Gate Positioning

Model LCE Ordering Guide

Blue type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



For specification
assistance call
Customer Service at
1-800-894-0412

Model LCE Resolution Table

Cycles Per Inch	002	020	040	050	100	200	250	500
Resolution	0.500"	0.050"	0.025"	0.020"	0.010"	0.005"	0.004"	0.002"

Contact Customer Service for other resolutions

NOTES:

- 1 For non-standard cable lengths, add a forward slash (/) plus cable length expressed in feet. Example: G/6=6 feet of cable.
- 2 For Mating Connectors, Cables, and Cordsets see Electrical Accessories on the web at Encoder site.

Model LCE - Linear Cable Encoder

Model LCE Specifications

Electrical

Input Voltage.....4.75 to 28 VDC max for temperatures up to 85° C
 4.75 to 24 VDC for temperatures between 85° and 100° C
 Input Current.....80 mA maximum with no output load
 Input Ripple.....100 mV peak-to-peak at 0 to 100 kHz
 Output Format.....Incremental- Square wave with channel A leading B during linear extension
 Output Type.....Open Collector- 250 mA max per channel
 Pull-Up- 250 mA max per channel
 Push-Pull- 20 mA max per channel
 Line Driver- 20 mA max per channel (Meets RS 422 at 5 VDC supply)
 Index.....Once per 5" cable extension or retraction
 Freq Response.....0 to 125 kHz
 Symmetry.....180° (±18°) electrical
 Quad Phasing.....90° (±22.5°) electrical
 Rise Time.....Less than 1 microsecond

Mechanical

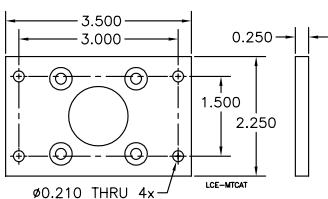
Full Stroke.....50" standard. Longer measuring ranges may be available, please contact Customer Service.
 Length (FSL).....
 Finish.....Black powder coated aluminum
 Accuracy.....±0.10% of FSL
 Repeatability.....±0.015% of FSL
 Linear Resolution.....Up to 500 cycles per inch (0.002" per cycle)
 Cable Material.....0.034" nylon coated stainless steel rope
 Cable Tension.....20 oz maximum typical
 Life (cycles).....1,000,000 predicted at zero angle cable exit
 Electrical Conn.....6-, 7-, or 10-pin MS Style, 5-, or 8-pin M12 (12 mm), Gland with 18" cable (foil and braid shield, 24 AWG conductors), Solder Terminal with conduit box, or Solder Terminal with conduit box
 Weight.....19 oz typical

Environmental

Operating Temp.....0° to 85° C, or 0° to 100° C for 5-24 VDC
 Sealing.....IP65 for Industrial LCE

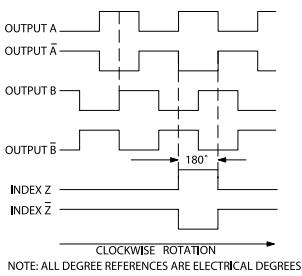
Optional Mounting Plate

Attaches to Standard or Industrial LCE in three different orientations. Order Accessory Item 176064-01

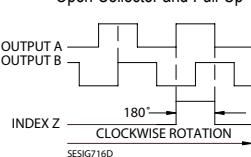


Waveform Diagrams

Line Driver and Push-Pull



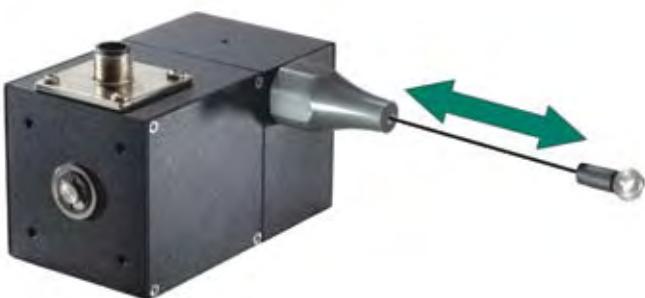
Open Collector and Pull-Up



Wiring Tables

Function	Gland Cable Wire Color	5-pin M12	8-pin M12	10-pin MS	7-pin MS HV	7-pin MS O, S PP	6-pin MS HV No Index	6-pin MS O, S PP	Term. Block HV No Index	Term. Block O, S PP
Com	Black	3	7	F	F	F	A	A, F	1	1, 6
+VDC	Red	1	2	D	D	D	B	B	2	2
A	White	4	1	A	A	A	C	D	3	4
A'	Brown	---	3	H	C	---	D	---	4	---
B	Blue	2	4	B	B	B	E	E	5	5
B'	Violet	---	5	I	E	---	F	---	6	---
Z	Orange	5	6	C	---	C	---	C	---	3
Z'	Yellow	---	8	J	---	---	---	---	---	---
Case	Green ¹	---	---	G	G	G	---	---	---	---
Shield	Bare	---	---	---	---	---	---	---	---	---

¹E-Cube Only



Model TR1 - Tru-Trac™ Encoder/Spring Loaded Measuring Wheel



Features

- Encoder And Measuring Wheel Solution Integrated Into One Compact Unit
- Spring Loaded Torsion Arm Makes Wheel Pressure Adjustments A Snap
- Easily Installed In A Vertical, Horizontal, or Upside-Down Orientation
- Operates Over A Variety Of Surfaces At Speeds Up To 3000 Feet Per Minute
- Integrated Module Simplifies Your System Design, Reducing Cost

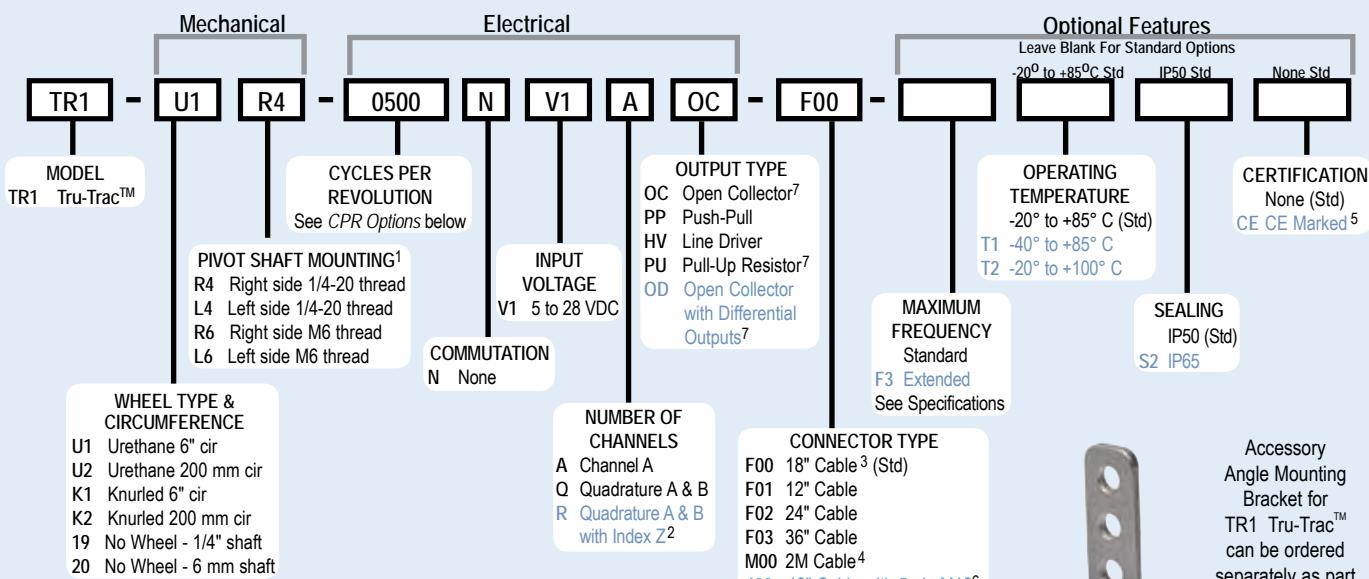
FINALLY! An integrated encoder and spring loaded measuring wheel assembly available in one, easy-to-use, compact unit. The NEW Tru-Trac™ by Encoder Products Company is a versatile solution for tracking velocity, position, or distance over a wide variety of surfaces in almost any application. It's spring-loaded torsion arm provides a simple-to-adjust torsion load, allowing the Tru-Trac™ to be mounted in almost any orientation, even upside-down. The threaded shaft on the pivot axis is field reversible providing mounting access from either side. The Tru-Trac™ housing is a durable, conductive composite material that will eliminate static build up. With operating speeds up to 3000 feet per minute and a wide variety of configuration options, it's easy to see the Tru-Trac™ is the ideal solution for countless applications.

Common Applications

Web Tension Control, Paper Monitoring, Glue Dispensing, Linear Material Monitoring, Conveyor Systems, Printing, Labeling, Document Handling

Model TR1 - Tru-Trac™ Ordering Guide

Blue type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



For specification assistance call

Customer Service at
1-800-894-0412



Accessory Angle Mounting Bracket for TR1 Tru-Trac™ can be ordered separately as part # 140104

Dimensional drawing available at Encoder site.

Model TR1 - Tru-Trac™ CPR Options

0001 thru 0189*	0198	0200	0250
0256	0300	0315	0360
0500	0512	0580	0600
1000	1024	1200	1250
1800	2000	2048	2500
3000	4096	5000	6000
10,000			8192

*Contact Customer Service For Availability

New CPR values are periodically added to those listed. Contact Customer Service to determine all currently available values. Special disk resolutions are available upon request and may be subject to a one-time NRE fee.

NOTES:

- 1 See mechanical drawing. Shaft is reversible in the field.
- 2 Contact Customer Service for non-standard index gating or phase relationship options.
- 3 For non-standard English cable lengths enter 'F' plus cable length expressed in feet. Example: F06 = 6 feet of cable. Frequency above 300 kHz standard cable lengths only.
- 4 For non-standard metric cable lengths enter 'M' plus cable length expressed in meters. Example: M06 = 6 meters of cable.
- 5 Please refer to Technical Bulletin TB100: *When to Choose the CE Option* at Encoder site.
- 6 5-pin not available with Line Driver (HV) output. Additional cable lengths available. Please consult Customer Service.
- 7 With Input Voltage above 16 VDC, operating temperature is limited to 85° C.

Model TR1 - Tru-Trac™

Model TR1 - Tru-Trac™

Specifications

Electrical

Input Voltage 4.75 to 28 VDC max for temperatures up to 85° C
 4.75 to 24 VDC for temperatures between 85° C to 100° C
 Input Current 100 mA max (65 mA typical) with no output load
 Output Format Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the wheel side. See *Waveform Diagrams* below.
 Output Types Open Collector- 20 mA max per channel
 Push-Pull- 20 mA max per channel
 Pull-Up- Open collector with 2.2K ohm Pull-Up 20mA max per channel
 Line Driver- 20 mA max per channel (Meets RS 422 at 5 VDC supply)
 Index Once per revolution.
 0190 to 10,000 CPR: Gated to output A
 0001 to 0189 CPR: Ungated
 See *Waveform Diagrams* below.
 Max. Frequency Standard Frequency Response is 200 kHz for CPR 1 to 2540
 500 kHz for CPR 2541 to 5000
 1 MHz for CPR 5001 to 10,000
 Extended Frequency Response (optional) is 300 kHz for CPR 2000, 2048, 2500, and 2540
 Noise Immunity Tested to BS EN61000-6-2; BS EN50081-2; BS EN61000-4-2; BS EN61000-4-3; BS EN61000-4-6, BS EN500811
 Symmetry 180° (±18°) electrical
 Quad. Phasing 90° (±22.5°) electrical
 Min. Edge Sep 67.5° electrical
 Accuracy Within 0.017° mechanical or 1 arc-minute from true position. (for CPR>189)

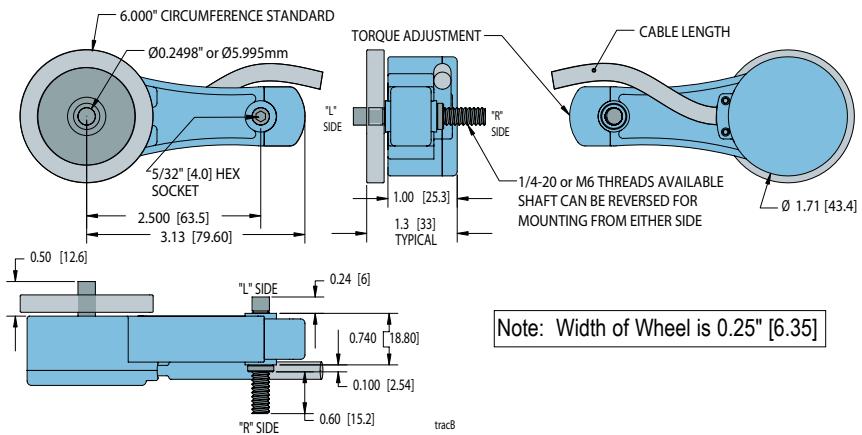
Mechanical

Max Shaft Speed 6000 RPM. Higher speeds may be achievable, contact Customer Service.
 Shaft Material Stainless Steel
 Shaft Tolerance +0.0000/-0.0004" [+0.000/-0.010 mm]
 Radial Shaft Load 5 lb max. Rated load of 2 to 3 lb for bearing life of 1.2×10^{10} revolutions
 Axial Shaft Load 5 lb max. Rated load of 2 to 3 lb for bearing life of 1.2×10^{10} revolutions
 Starting Torque IP50 0.05 oz-in
 IP65- 0.4 oz-in
 Electrical Conn 18" cable (foil and braid shield, 24 AWG conductors), 5- or 8-pin M12 (12 mm) in-line connector with 18" cable (braid shield)
 Mounting Pivot shaft can be mounted from either side of the Tru-Trac™ housing, and is reversible in the field. Specify 1/4-20 or M6 threads
 Housing Stainless steel fibers in a high temperature nylon composite
 Wheel Width..... 0.25"
 Weight..... 5 oz typical

Environmental

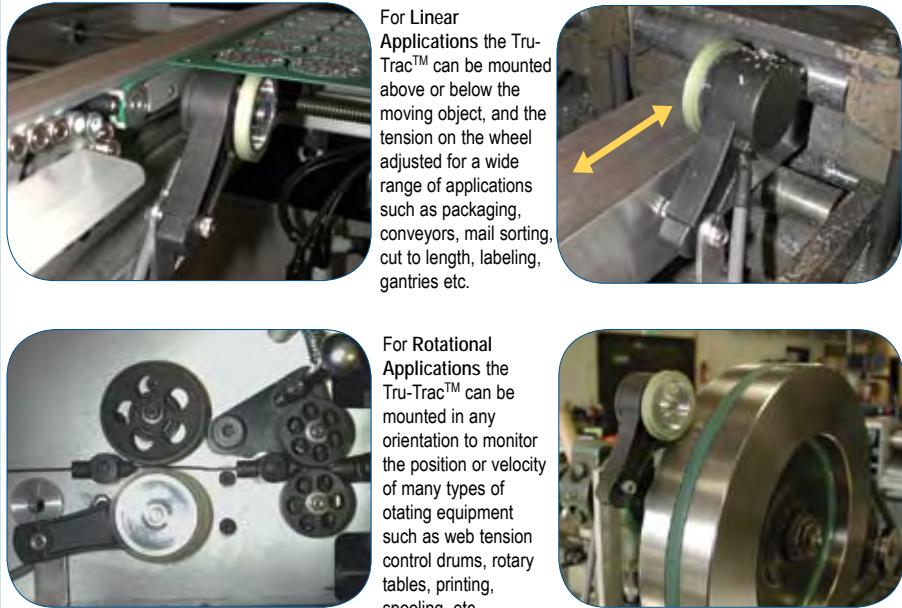
Operating Temp..... -20° to +85° C for standard models
 -40° to +85° C for low temperature option
 -20° to +100° C for high temperature option
 Storage Temp..... -25° to +85° C
 Humidity 98% RH non-condensing
 Vibration..... 10 g @ 58 to 500 Hz
 Shock 80 g @ 11 ms duration
 Sealing IP50 standard; IP65 available

Model TR1 - Tru-Trac™



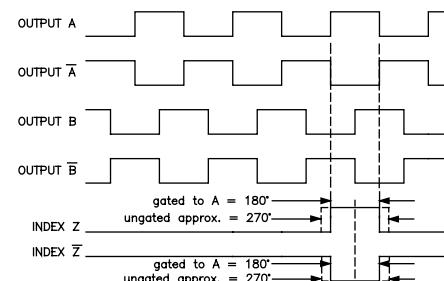
All dimensions are in inches with a tolerance of $\pm 0.005"$ or $\pm 0.01"$ unless otherwise specified
 Metric dimensions are given in brackets [mm]

Model TR1 - Tru-Trac™ Applications



Waveform Diagram

INCREMENTAL SIGNALS



Waveform shown with optional complementary signals \bar{A} , \bar{Z} for HV and OD outputs only.

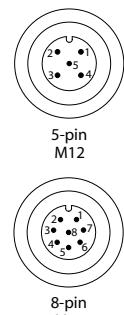
Wiring Table

Function	Cable Wire Color	5-pin M12**	8-pin M12**
Com	Black	3	7
+VDC	White	1	2
A	Brown	4	1
A'	Yellow	--	3
B	Red	2	4
B'	Green	--	5
Z	Orange	5	6
Z'	Blue	--	8
Shield	Bare *	--	--

* CE Option: Cable shield (bare wire) is connected to internal case.

** Non-CE Option: Cable shield is connected to M12 connector body.

CE Option: Cable shield is connected to M12 connector body, and internal case.

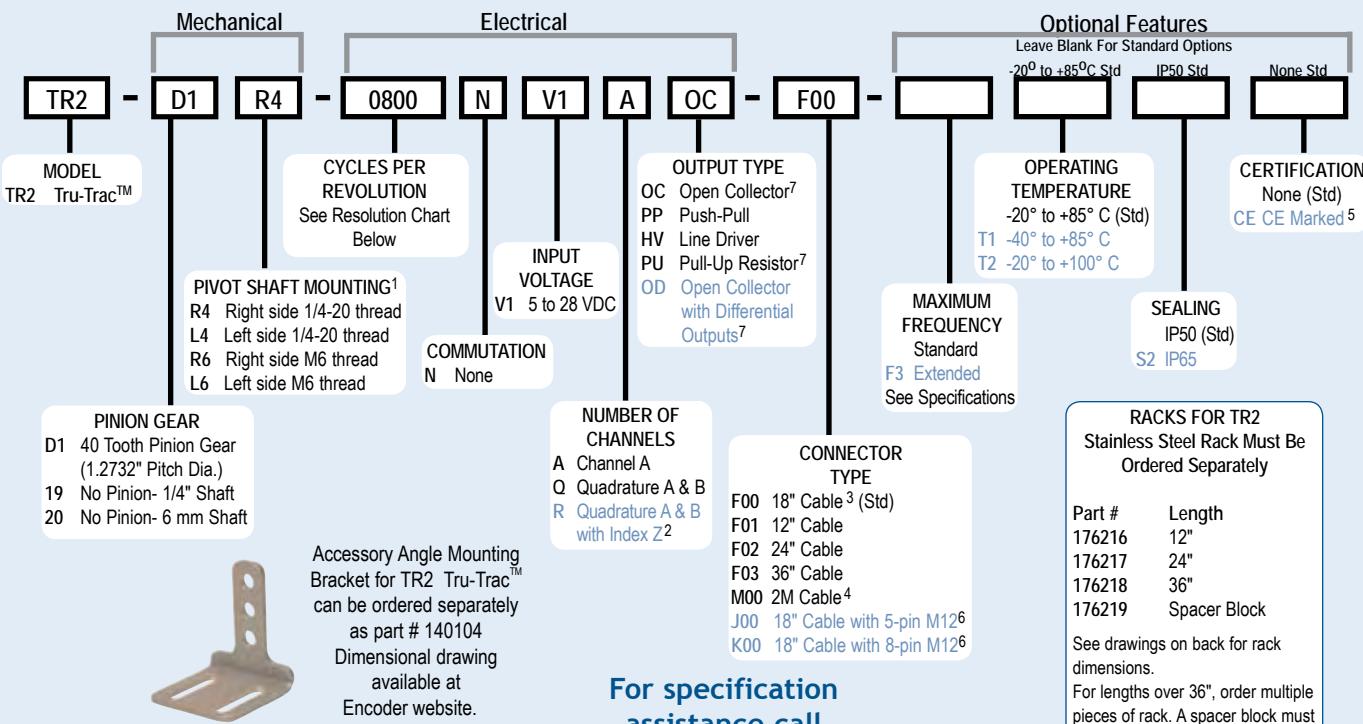


Model TR2 - Tru-Trac™ Encoder With Rack And Pinion Gearing



Model TR2 - Tru-Trac™ Ordering Guide

Blue type indicates price adder options. Not all configuration combinations may be available. Contact Customer Service for details.



Model TR2 - Tru-Trac™ CPR Options

Red resolutions are common. See charts on back for more information.

0001 thru 0189*	0198	0200	0250	0256
0300	0315	0360	0400	0500
0580	0600	0800	1000	1024
1250	1500	1800	2000	2048
2540	3000	4096	5000	6000
10,000				8192

*Contact Customer Service For Availability

New CPR values are periodically added to those listed.

Contact Customer Service to determine all currently available values. Special disk resolutions are available upon request and may be subject to a one time NRE fee.

Features

- Encoder With Rack And Pinion Gear Integrated Into One Compact Unit
- Easily Installed In A Vertical, Horizontal, Or Upside-Down Orientation
- Operates At Speeds Up To 400 Feet Per Minute
- Spring Loaded Torsion Arm Eliminates Gear Backlash
- Integrated Module Simplifies Your System Design, Reducing Cost

Backlash B-Gone! At last, a linear encoder solution with no back-lash or slippage. The NEW TR2 Tru-Trac™ is a versatile solution for tracking velocity, position, or distance in almost any application, featuring an integrated encoder with a rack and pinion gear assembly. Using the Rack and Pinion gear system, encoder readings can be obtained with repeatable positioning, providing excellent accuracy. Racks can be ordered in varying lengths, and with the accessory spacer block, multiple lengths of rack can be joined for easy installation. Due to the spring loaded torsion arm, which provides simple to adjust torsion load, the TR2 has all the flexibility and maneuverability of the original TR1 Tru-Trac™. It has the ability to be installed in a horizontal, vertical, or upside down position. The threaded shaft on the pivot axis is field reversible, providing mounting access from either side, and the durable conductive composite housing material will eliminate static build up. With so many configuration options in a simple integrated encoder solution, it is easy to see that the TR2 is on the right Track for success!

Common Applications

X-Y Tables, Gantry Systems, Packaging Machinery, Cut-To-Length, Printing, Labeling, Document Handling, Machine Shop Equipment

**For specification assistance call
Customer Service at
1-800-894-0412**

NOTES:

- 1 See mechanical drawing. Shaft is reversible in the field.
- 2 Contact Customer Service for non-standard index gating or phase relationship options.
- 3 For non-standard English cable lengths enter 'F' plus cable length expressed in feet. Example: F06 = 6 feet of cable. Frequency above 300 kHz standard cable lengths only.
- 4 For non-standard metric cable lengths enter 'M' plus cable length expressed in meters. Example: M06 = 6 meters of cable.
- 5 Please refer to Technical Bulletin TB100: *When to Choose the CE Option* at Encoder site.
- 6 5-pin not available with Line Driver (HV) output. Additional cables lengths available.
- 7 With Input Voltage above 16 VDC, operating temperature is limited to 85° C.

Model TR2 - Tru-Trac™

Model TR2 - Tru-Trac™ Specifications

Electrical

Input Voltage 4.75 to 28 VDC max for temperatures up to 85° C
 4.75 to 24 VDC for temperatures between 85° C to 100° C
 Input Current 100 mA max (65 mA typical) with no output load
 Output Format Incremental- Two square waves in quadrature with channel A leading B for clockwise shaft rotation, as viewed from the wheel side. See *Waveform Diagrams* below.
 Output Types Open Collector- 20 mA max per channel
 Push-Pull- 20 mA max per channel
 Pull-Up- Open collector with 2.2K ohm Pull-Up 20mA max per channel
 Line Driver- 20 mA max per channel (Meets RS 422 at 5 VDC supply)
 Index Once per revolution.
 0190 to 10,000 CPR: Gated to output A
 0001 to 0189 CPR: Ungated
 See *Waveform Diagrams* below.
 Max. Frequency Standard Frequency Response is 200 kHz for CPR 1 to 2540
 500 kHz for CPR 2541 to 5000
 1 MHz for CPR 5001 to 10,000
 Extended Frequency Response (optional) is 300 kHz for CPR 2000, 2048, 2500, and 2540
 Noise Immunity Tested to BS EN61000-6-2; BS EN50081-2; BS EN61000-4-2; BS EN61000-4-3; BS EN61000-4-6, BS EN500811
 Symmetry 180° (±18°) electrical
 Quad. Phasing 90° (±22.5°) electrical
 Min. Edge Sep 67.5° electrical
 Accuracy Within 0.017° mechanical or 1 arc-minute from true position. (for CPR>189)

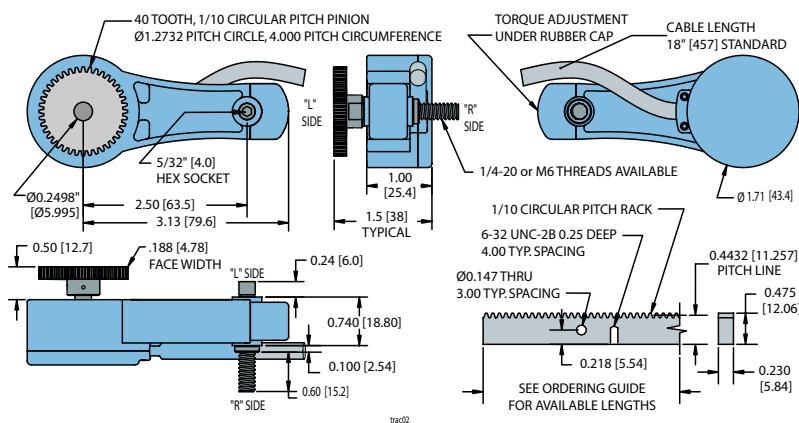
Mechanical

Max Linear Speed... 400 Feet Per Minute. Speeds over 200 FPM require lubricant, such as MoS₂ paste, to reduce gearing wear. Higher speeds may be achievable, contact Customer Service.
 Rack and Pinon
 Material 303 Stainless Steel
 Gearing Tolerance... AGMA 10, 20 degree pressure angle teeth
 Accuracy ±0.0005 inch/inch max accumulated error
 Repeatability ±0.0001 inch
 Radial Shaft Load .. 5 lb max. Rated load of 2 to 3 lb for bearing life of 1.2 x 10¹⁰ revolutions
 Axial Shaft Load..... 5 lb max. Rated load of 2 to 3 lb for bearing life of 1.2 x 10¹⁰ revolutions
 Starting Torque..... IP50 0.05 oz-in
 IP65- 0.4 oz-in
 Electrical Conn 18" cable (foil and braid shield, 24 AWG conductors), 5- or 8-pin M12 (12 mm) in-line connector with 18" cable (braid shield)
 Mounting Pivot shaft can be mounted from either side of the Tru-Trac™ housing, and is reversible in the field. Specify 1/4-20 or M6 threads
 Housing Stainless steel fibers in a high temperature nylon composite
 Weight 5 oz typical

Environmental

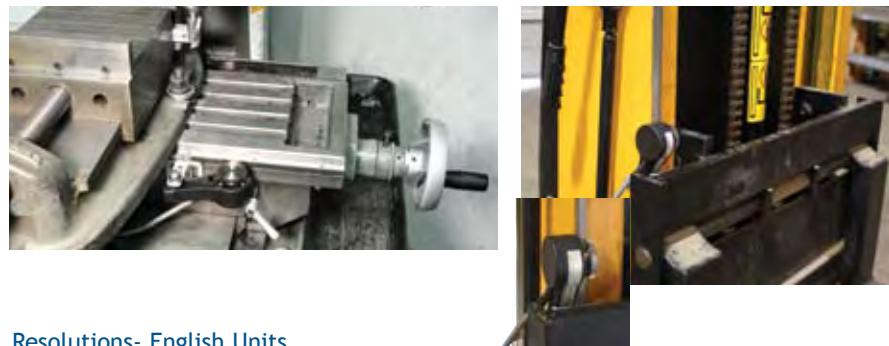
Operating Temp..... -20° to +85° C for standard models
 -40° to +85° C for low temperature option
 -20° to +100° C for high temperature option
 Storage Temp..... -25° to +85° C
 Humidity 98% RH non-condensing
 Vibration 10 g @ 58 to 500 Hz
 Shock 80 g @ 11 ms duration
 Sealing IP50 standard; IP65 available

Model TR2 - Tru-Trac™



All dimensions are in inches with a tolerance of ±0.005" or ±0.01" unless otherwise specified
 Metric dimensions are given in brackets [mm]

Model TR2 - Tru-Trac™ Applications



Resolutions- English Units

Inches Per Pulse	Pulses Per Inch	Disc Cycles Per Revolution
0.01	100	400
0.005	200	800
0.004	250	1000
0.002	500	2000
0.001	1000	2000*
0.0005	2000	2000**
0.0004	2500	2500**
0.0002	5000	2500***
0.0001	10,000	2500****

*Requires 2x external quadrature counting
 **Requires 4x external quadrature counting
 *Requires 2x Interpolation
 **Requires 4x Interpolation

Resolutions- Metric Units

mm Per Pulse	Pulses Per mm	Disc Cycles Per Revolution
0.04	25	2540
0.02	50	2540*
0.01	100	2540**

*Requires 2x external quadrature counting

**Requires 4x external quadrature counting

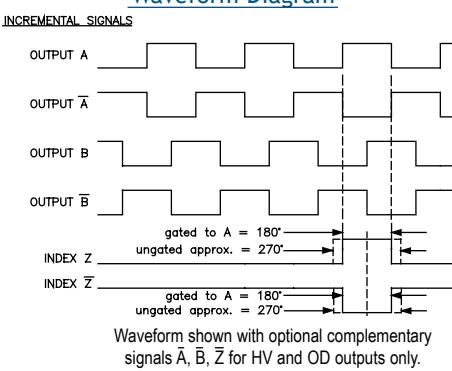
Wiring Table

Function	Cable Wire Color	5-pin M12**	8-pin M12**
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B'	Green	--	5
Z	Orange	5	6
Z'	Blue	--	8
Shield	Bare *	--	--

* CE Option: Cable shield (bare wire) is connected to internal case.

** Non-CE Option: Cable shield is connected to M12 connector body. CE Option: Cable shield is connected to M12 connector body, and internal case.

Waveform Diagram



Waveform shown with optional complementary signals \bar{A} , \bar{B} , \bar{Z} for HV and OD outputs only.



Additional Pinion Gears for TR2 Tru-Trac™ can be ordered separately as part # 176220

Ordering/Delivery/ Technical Support

Ordering Through a Distributor

Encoder Products Company has distributors across the United States and Canada. Call 800-894-0412 and ask a Customer Service Representative for a distributor in your area.

Part Numbers

Accu-Coder™ part numbers are found on the model Datasheet located at encoder website. Use the appropriate *Ordering Guide* for your particular model. It is important to specify the complete part number. If you are reordering, the serial number of the unit being replaced will help speed the ordering process. Ordering with incomplete information may delay product delivery. In addition, Encoder Products Company cannot assume responsibility for errors when a part number is incomplete. If you need help creating a part number, contact Customer Service.

Product Lead Time

Standard lead time is 4 to 6 business days. Expedite Service is available upon request. Accessories are generally in stock and available for quick delivery. Contact Customer Service to confirm lead times.

Next Day Express

Single-piece orders for many of our products can ship the next business day without an expedite charge. Contact Customer Service for details.

Expedite Service

One, two, and three working day expedited service is available upon request. Contact Customer Service for applicable expedite charges. Expedited service is done on a "best efforts" basis. In some cases a part shortage or other unforeseen factor may cause an expedited order to ship late. In such a case, the expedite charge is prorated.

Confirming an Order

Confirmation by mail or fax is required for all telephone orders. Please be sure the order is clearly marked "confirmation". Please check your purchase order against the acknowledgment that Encoder Products Company faxes to you. To ensure accuracy, a Customer Service Representative will check your confirmation against your order.

Change Orders

To change an order, ask for a Customer Service Representative. For faster service, either have your purchase order number or Encoder Products Company's sales order number available. Service charges are assessed for some changes, including order cancellations. Contact Customer Service to determine applicable charges.

Shipping Methods

Orders will be shipped out by UPS or Federal Express. All shipments are F.O.B. factory.

Consignment & Evaluation Units

If you are a new OEM account or have a new OEM application, consignment or evaluation units may be available for up to 60 days. Contact Customer Service for complete details.

Technical Application Support

Our Technical Support professionals are available to assist you in your application needs - whether its selecting the right encoder for your application, troubleshooting a new installation, or connecting your new encoder to your motion control system.

Custom Design Service

If your application calls for a solution that cannot be solved using off-the-shelf-products, EPC's Custom Design Service may be just what you need. A simple phone call to Customer Service will put our expertise to work for you.

Expert Cross Reference & Retrofit Service

Encoder Products Company understands the importance of time when you have a machine down. Through its free Cross Reference and Retrofit Service, and thanks to a thorough library of specifications and dimensional information for a wide range of competitive encoders, EPC offers expert assistance for the cross-referencing and/or retrofit replacement of most domestic and foreign optical rotary encoders. In addition, serviceable replacements can often be found for encoders that use other technologies. As a final service, for those hard to find units, EPC can often suggest an alternative approach that will get you back up and running. We have provided an Expert Cross-Reference Service page on our website. It provides you with part numbers of competitors encoders, and compares them with Accu-Coder™ encoders, so that you can begin the cross-referencing process.

Direct Replacements

Encoder Products has identified some of the encoders on the market that are currently hard to find or replace. We have labeled these "Direct Replacement Encoders" and have made a selection available at Encoder site.